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HAWAII AGRICULTURAL EXPERIMENT STATION, HONOLULU.

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PRESS BULLETIN No 3.

PRELIMINARY EXPERIMENTS WITH THE "QUICK BLIGHT" OF THE POTATO.

Irish potato growing was once an important agricultural industry in Hawaii. During one year, 71,000 barrels were shipped from the country; but for various reasons the industry became of minor importance and of late years the local demand has been largely supplied by importations. The latest source of discouragement to the grower is a disease which often wipes out whole fields of potatoes in a short time. Nearly every island of the group has its infected districts—Kula, Kohala, Kona, Waimea and sections on Oahu.

This disease of the potato has been confounded with the potato rot, but they are entirely different both in the cause and in their effect upon the plant. Until a better name is given we shall call it The "Quick Blight" of the potato. While the same disease apparently exists in some of the Northern states it has been little studied. Reports upon the disease from the Division of Pathology, Washington, D. C., indicate that it is caused by a *Fusarium* fungus, the exact history of which is not fully known. This fungus lives in the soil and as soon as the potatoes are planted it attacks the roots. These become so filled with the growing fungus that they cannot perform their proper function, and the plant really dies from starvation and lack of water.

The casual observer might not detect the disease until long after the destruction has begun, as there is little to indicate its presence. The vines usually make a good thrifty growth and seem to be healthy until shortly after blossoming, when, without warning, the leaves and stem wither, turn black and die to the ground as though bitten by frost.

Since the disease has its seat in the roots in the early growth of the plant, eradication becomes most difficult. Many fungus diseases are located wholly on the leaves and stems of the plant, and in such cases, the problem of control or eradication is not so difficult; but with the Quick Blight the measures must be preventative rather than curative.

In March 1902, experiments were begun at Kula, Maui, to study the disease with the hope of finding a remedy. The land chosen was under the control of Mrs. Randal Von Tempsky, and was situated at an elevation of between 3,500 and 4,000 feet. Three plots were laid out for the experiment. Plot 1 was in a gulch partly protected from the wind; the soil was rich and the previous year a crop of beans had been planted there. Plots 2 and 3 were on a ridge unprotected from the wind; the soil was of fair quality and had been planted to corn and potatoes for a number of seasons. Plots 2 and 3 were adjacent. In Plots 1 and 3 the soil was dug to the depth of from 5 to 7 inches (the usual depth for this district); that in Plot 2 was dug to the depth of 12 inches bringing to the surface some of the yellow sub-soil.

The plan of the experiment was to test comparatively the resisting power to the disease of 45 imported varieties of potatoes. These were to be planted under varied conditions—on good soil partly protected from the wind, on average soil dug to the depth of 12 inches, and on average soil dug to the depth in common practice in that locality. The 45 varieties of potatoes used in the experiment were: Northern Beauty, Gem of Aroostook, Early Harvest, Early Northern, New Queen, The Minister, Carman No. 1, Green Mountain, Beauty of Hebron, Pearl of Savoy, Black Christy, White Elephant, Dakota Red, Early Rose, Early Fortune, Early Six Weeks, I. X. L., Pride of the South, The June,

Acme, Bovee, Breck's Chance, Burpee's Extra Early, Cambridge Russet, Early Ohio, Early Michigan, Fillbasket, Honeoye Rose, Hammond's Wonderful, Irish Cobbler, Long Keeper, Carman No. 3, Mill's Banner, Mill's Prize, Maul's Thoroughbred, Manun's Enormous, Nott's Peach, Prolific Rose, Rural New Yorker No. 2, Sir Walter Raleigh, Stephens, Steuben, Twentieth Century, Uncle Sam, and Wonderful Clay Rose.

In Plot 1 the seed was planted in hills 30 inches apart each way. The first three hills were planted with the whole seed; the next four with the seed cut in two, and the last nine with seed cut in three pieces. Each of the 45 varieties was treated in this way. In Plot 2 the seed was planted whole and cut in two. Plot 3 was planted with seed cut in pieces of convenient size (the ordinary method of planting); the hills were four feet apart each way in order that corn or other crops might be planted between the rows.

The potatoes apparently grew well until the early part of June when the Quick Blight made its appearance in the leaves and stems. The crop was harvested June 27.

RESULTS OF THE EXPERIMENT.

The varieties that best withstood the Quick Blight were The June, Honeoye Rose, Maul's Thoroughbred and Uncle Sam, and of these The June remained green after the others had succumbed.

Comparing Plots 2 and 3 it was found that the vines in Plot 2 (dug to the depth of 12 inches) were much harder than those in plot 3 (dug to the depth of 5 inches). The reason for this, it is believed, is that the fungus is most abundant in the surface soil and that when Plot 2 was dug to the depth of 12 inches the disease germs were turned under so that the fungus was partly killed out of the soil as it came in contact with the sub-soil where it found little nourishment.

No conclusions could be drawn as to the value of planting seed whole, cut in two or cut in three pieces.

It is generally admitted that it is more economical to grow potatoes from seed cut in pieces just large enough to furnish nourishment for the plant until it gets a good hold on the soil. Season, soil, climate and water all have a bearing on this question.

While by continued experiment it might be possible to find a variety of potato that would be immune to the Quick Blight, it would require much time and expense to determine, introduce and establish such a variety. Should a variety be found that will resist the disease the question would then arise as to its market value, productiveness, keeping qualities, etc. Throughout the experiment the June variety resisted the Quick Blight the best. On other plots than those of the experiment station the same observation was made. However, repeated trials would be the only means of determining whether the resistance to this disease shown by this variety during these preliminary experiments was anything more than accidental.

At present none of these varieties can be definitely recommended, as one season's experiment is not conclusive. Further experiments with the four varieties which showed a tendency to resistance (The June, Honeoye Rose, Maul's Thoroughbred and Uncle Sam), are to be conducted at Kula, Maui, during the coming season. Attention will be given to the prevention of Quick Blight by the application of fertilizers, deep cultivation, and by treating the seed, plants and infected soil with fungicides.

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